Unit 2

Plumbing and Sanitary Fixtures

PLUMBING AND SANITARY FIXTURES

You must have seen plumbing and sanitary fittings and fixtures installed in the kitchen, bathroom or toilets of your home, school or other buildings. Many people confuse the words plumbing fittings and plumbing fixtures. A fixture is a part that is connected to a plumbing system and carries water through a building. The most common plumbing fixtures are bathtubs, sinks, showers, tubs, toilets and faucets. While a fixture can be fixed into walls or the floor, a fitting is an item that can be hung by a hook, screw or nail.

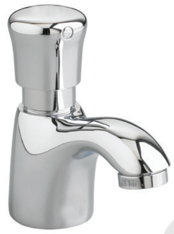


Fig. 2.1: Tap or Faucet

TAP OR FAUCET

A tap or faucet is a valve used for controlling or release of liquids or gas. These taps are available in varieties for the simple act of turning a tap or faucet on or off.

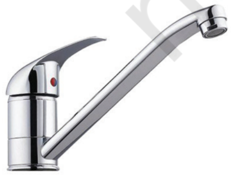


Fig.2.2: Single Lever Mixer

Single Lever Mixer

It is meant to control the water and temperature. A single lever handle tap or faucet is easy to grip and turn. These are available in many decorative styles.

Joystick

It is similar to a lever handle tap or faucet, yet with a different look and different range of motion.

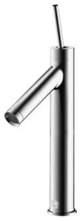


Fig.2.3: Joystick

Push Tap or Faucet

It turns the water on with a push instead of turning a handle or knob. It is used for predetermined flow of water.

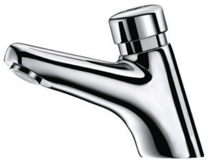


Fig.2.4: Push Tap

Sensor Tap or Faucet

It does not require handles or knobs at all. Most automatic taps or faucets are battery powered and incorporate a passive infrared sensor to detect hand motion. Automatic taps or faucets are common in public washrooms, particularly airports and hotels, where they help reduce water consumption and transmission of disease causing microbes.

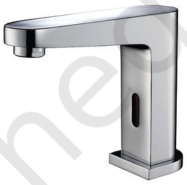


Fig.2.5: Sensor Tap

SHOWER

The modern shower comes with configurable temperature and spray pressure settings, along with adjustable showerhead nozzle settings.

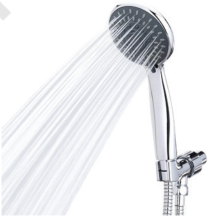


Fig.2.6: Shower

WASHBASIN

A washbasin is a bowl-shaped fixture used for washing hands, dishwashing or other purposes. The most significant difference between major washbasin types is the manner in which they are installed.

Wall-mounted

A wall-mounted washbasin hangs directly from the wall, taking up little space and offering easy access to plumbing hook-ups. These are ideal options for half baths and small bathrooms.

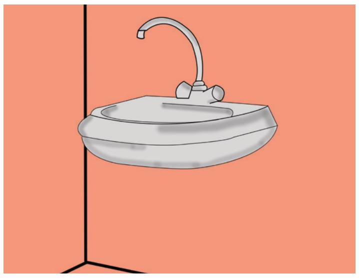


Fig.2.7: Wall-mounted washbasin

Pedestal

A pedestal washbasin is also wall-mounted washbasin that rests on a pedestal which may or may not provide actual support to the washbasin bowl. Usually, the pedestal conceals plumbing. The drawback of this type is the lack of storage space under the bowl.

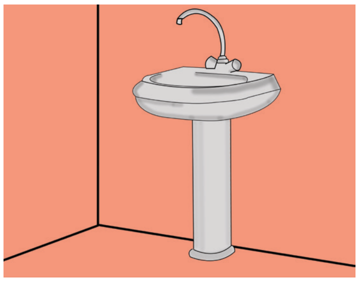
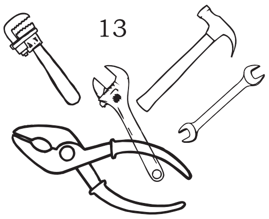


Fig.2.8: Pedestal washbasin



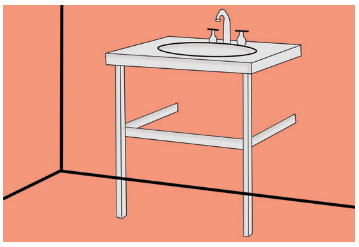


Fig. 2.9: Console washbasin

Console

A console washbasin is also wall-mounted that rests on legs. The legs support the front two corners while an apron often masks the plumbing hook-ups. A small storage space can be created underneath simply by placing a basket or a shelving unit.

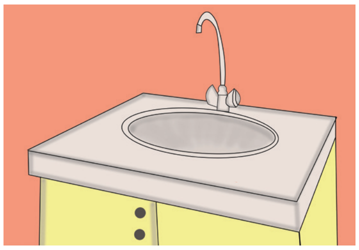


Fig. 2.10: Self Rimming washbasin

Self-rimming

A self-rimming washbasin drops into a cut-out in the countertop and is usually secured with mounting clips from below. The rim overlaps the cut out edges.

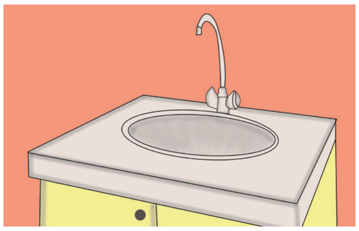


Fig. 2.11: Integral washbasin

Integral

An integral washbasin is usually made of solid surface material like Corian (acrylic polymer and alumina trihydrate derived from bauxite ore) and acrylic. The bowl and the countertop are one piece and easy to clean and maintain.

STANDARD DIMENSIONS FOR INSTALLATION

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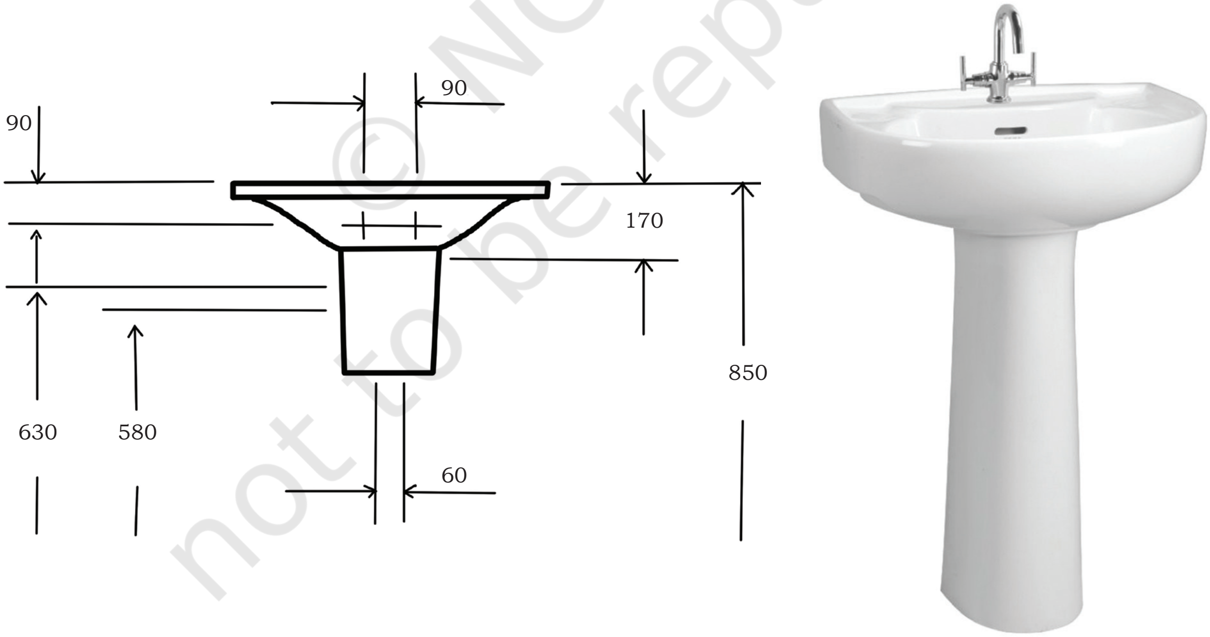
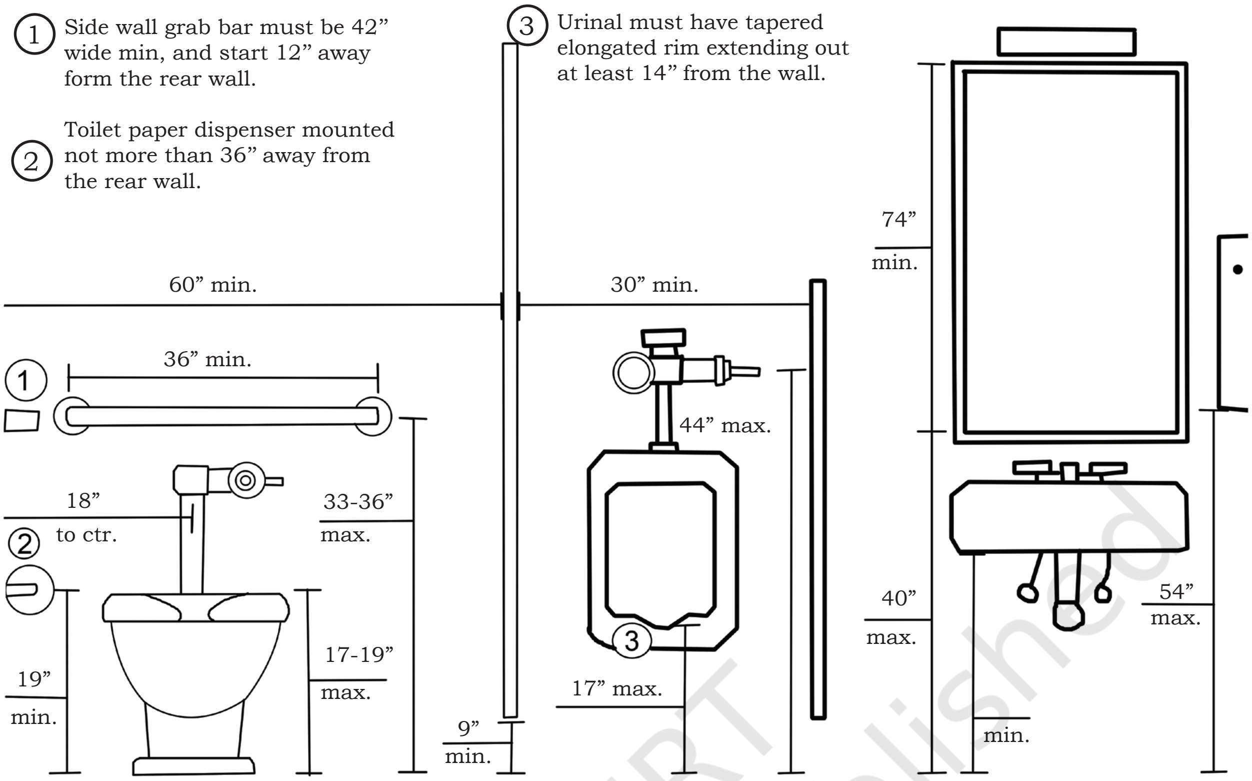


Fig.2.12: Installing a pedestal washbasin with a standard height in cms

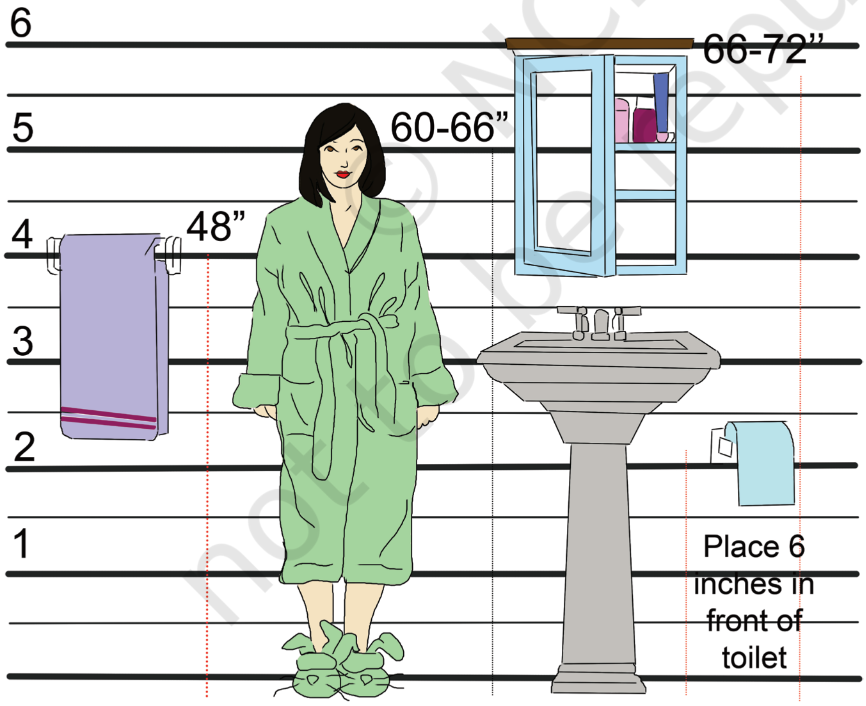


① Side wall grab bar must be 42” wide min, and start 12” away form the rear wall.

② Toilet paper dispenser mounted not more than 36” away from the rear wall.

③ Urinal must have tapered elongated rim extending out at least 14” from the wall.

Fig. 2.13: Standard toilet room specification in inches



6
5
4
3
2
1
66-72”
60-66”
48”
Place 6 inches in front of toilet

Fig.2.14: Standard height of fixtures in bathroom in inches

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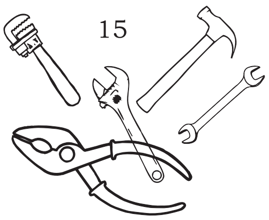

WATER CLOSETS

A water closet (WC) is a fixture for the toilets used to carry out human excreta.

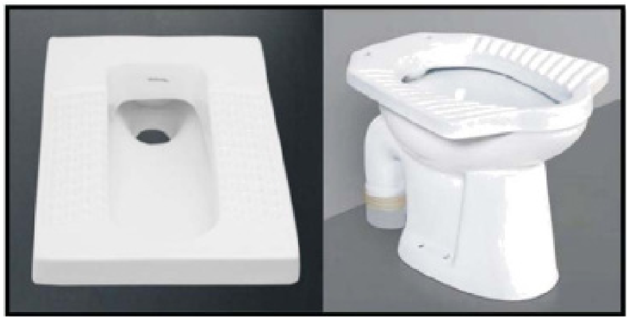

Fig.2.15: Indian water closet

Indian

An Indian water closet is commonly used in the eastern part of the world—India, Bangladesh including, Pakistan, Sri Lanka, Nepal and Bhutan. It is shaped in a way that one has to sit on one's haunches. Its basin has an inverted slope towards the back of the closet where a trap leads to the sewer pipe (drain) from it.

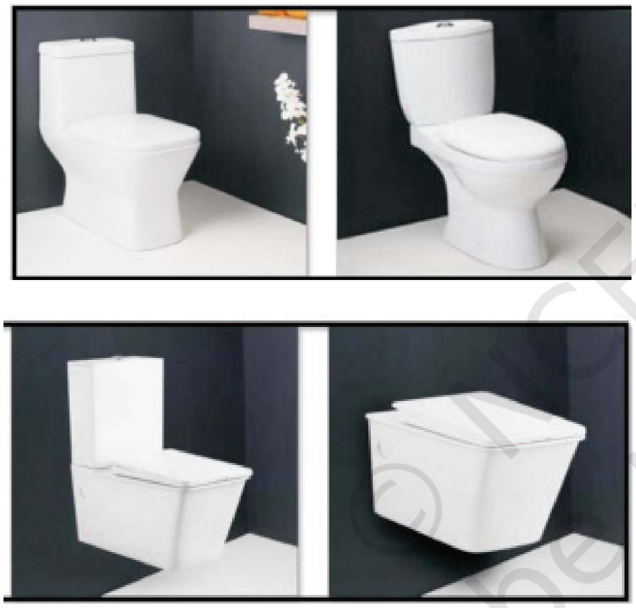

Fig.2.16: Western water closet

Western

A western water closet is very popular and commonly used in the western part of the world. It is shaped like a chair and is used in the same manner. It is sloped from the back and connects with the drain through a trap. There are two types of western water closets—a one-piece with a basin and the trap manufactured together; and a two-piece in which, the basin and the trap are manufactured separately.

FLUSHING CISTERN

A flushing cistern is used for storage and discharge of water for flushing out the excreta from a WC and urinals. A flushing cistern is also known as a water waste preventer. It is used to throw water with pressure after the use of the WC and urinals.

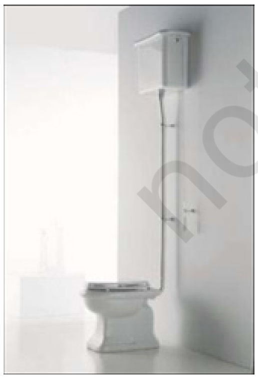

Fig.2.17: Flushing Cistern

Flush Tank

This is a tank that holds fluid in reserve for flushing and is attached to a toilet. Today's toilets are typically a two-piece (tank and bowl) plumbing fixture made out of vitreous china. The mechanical components, which are located inside the tank, work together as a system to perform a gravity flush.

Bell Flushing Cistern

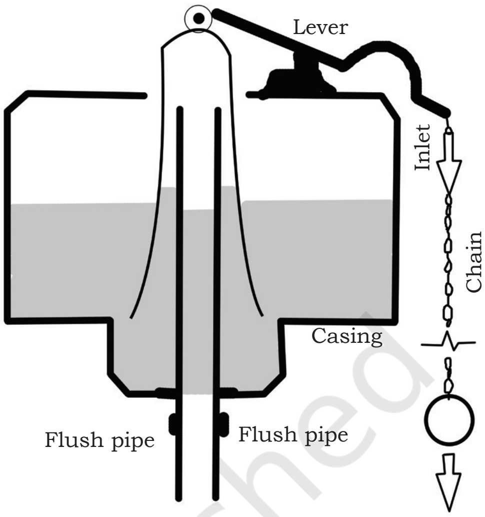

Fig.2.18: Bell Flushing Cistern

A bell flushing cistern is only suitable when installed at a height. It is made of cast iron with a capacity of 5 to 15 litres. Now virtually outdated, it may still be found in old factories, schools and similar established buildings. It consists of a bell connected to a flushing chain through a lever. When the chain is pulled, the bell is lifted and the water in the tank rushes through the flushing pipe by a siphon action. The float valve allows the water from the inlet into the cistern. Once the water starts moving down the pipe, it starts a siphon effect. The rest of the water is drawn from the cistern and the emptying action takes only a few seconds causing a powerful flush in the WC below. The chain should be released immediately after being pulled to force the water out of the flush pipe. This cistern is supplied with water through a ball valve arrangement. The water inlet closes when the cistern is full and open when it is empty, permitting entry of water. It also has an overflow pipe to drain out excess incoming water if the ballcock stops functioning to avoid overflow of water from the cistern into the toilet.

Flat-type Cistern

This type of cistern is placed at a height of 3ft above the floor, are commonly used now. It is generally made of plastic and has a flat valve inside. It stops the water after the tank gets filled and starts after the tank becomes empty. Water flushes out at the press of a button.

Automatic Cistern

This type of cistern is mainly used in urinals. A lot of water is used in these cisterns. These cisterns are mainly used in public places, for example, bus stands, railway stations, offices, etc.

URINALS

A device, usually attached to a wall into which men or boys can urinate. Urinal flushing is done by manual handles,time flush, automatic flush, waterless urinals.

Manual Handles

Each urinal is equipped with a button or a short lever to activate the flush. Users are expected to operate it before they leave. Such a directly controlled system is the most efficient, provided the patrons remember to use it.

Timed Flush

A constant drip-feed of water slowly fills the cistern, until a tipping point is reached. The valve opens (or a siphon begins to drain the cistern), and all the urinals in the group are flushed. Electronic controllers performing the same functions are also used.

Automatic Flush

Electronic automatic flushes solve the problems of both previous approaches, and are common in new installations. Passive infrared sensors identify when the urinal has been used (or when someone has stood in front of it and moved away), and activate the flush. Thus, the urinal gets cleaned and water is not wasted when the toilet is not in use. With a manual flush it might not have been possible.

Waterless Urinals

In this, a trap insert is filled with a sealant liquid instead of water. The lighter-than-water sealant floats on top of the urine collected in the U-bend, preventing odours from being released into the air. The cartridge and sealant must be periodically replaced.

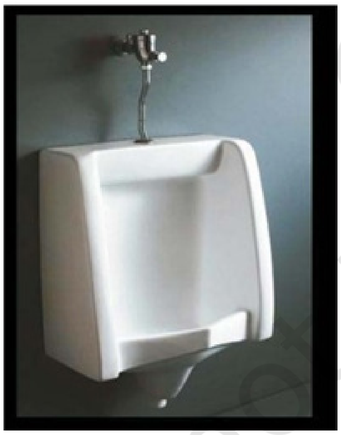

Fig.2.19: Waterless Urinals

BIDETS

Bidets are primarily used to wash and clean. They may also be used to clean any other part of the body, such as the feet. Despite appearing similar to a toilet, it would be more accurate to compare it to the washbasin or a bathtub.

Fig.2.20: Bathtub

BATHTUB

Installed in a bathroom, it is made of vitreous material, enamelled iron, plastic, marble, etc. Its length varies from 1.7 m to 1.85 m, the width is 70 cm × 75 cm and the depth varies from 43 cm to 45 cm to the outlet end. Cold and hot water taps are provided for filling the tank, and an overflow pipe is provided for excess water drainage. A waste coupling with a waste seal trap is provided at the drain with a rubber plug as in the washbasin.

Fig.2.21: Geyser

GEYSER

It is used for heating water. It is available in different capacities, up to 25 liters, as per requirement.

STANDARD HEIGHT OF SANITARY FIXTURES

Wet room installations are largely standardised and sanitaryware is supplied in a range of fixed dimensions. In the figure shown below the graphic representation shows a typical height of the most common sanitaryware. The sanitary fixtures, height are in cms.

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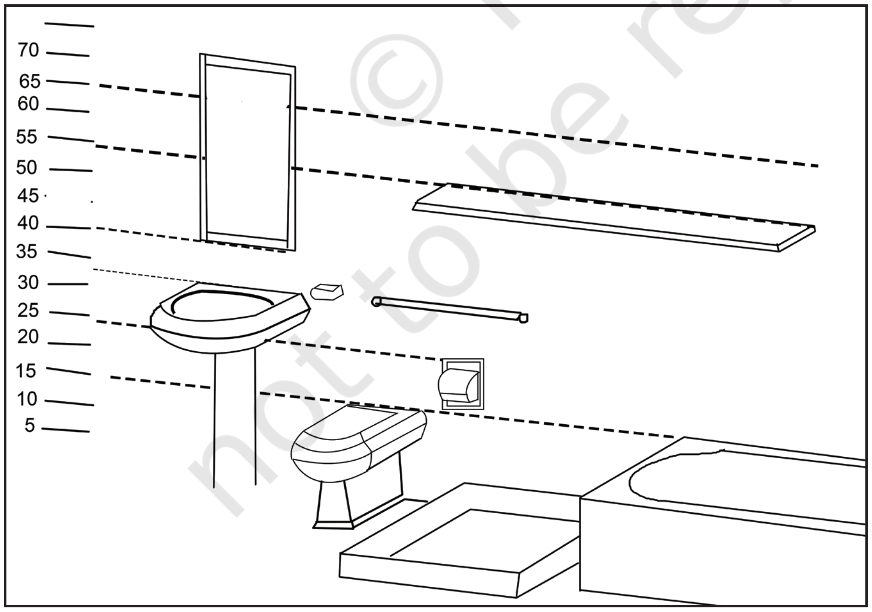


Fig.2.22: Dimensions are in inches

Practical Exercises

Activity 1

Make a list of plumbing fixtures fitted in your school

Material required

1. Drawing copy
2. Pencil

Procedure

1. Visit the school washroom.
2. Identify the different types of fixtures installed in the bathroom.
3. Note down the technical details of the fixtures in the bathroom.
4. Make a drawing for identifying the fixtures.

Activity 2

Sketch a washbasin

Material required

1. Pen
2. Drawing copy
3. Pencil

Procedure

1. Visit the bathroom at your home.
2. Identify the washbasin fitting.
3. Measure the dimensions.
4. Draw on your copy.

Activity 3

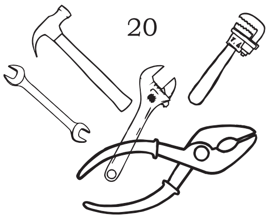
Measure the standard dimensions of installed of fixtures in the bathroom

Material required

1. Pen
2. Pencil
3. Copy

Procedure

1. Visit the bathroom at your home.
2. Identify the fitting fixtures in your bathroom.
3. Measure the dimensions with the help of a measuring tape.
4. Note down the dimensions in your notebook.
5. Discuss with the class teacher.



Check Your Progress

A. Short answer questions

1. Name the various types of plumbing and sanitary fittings with neat sketches and describe any one of these.
2. Write short notes on
   (a) Washbasin
   (b) Bathtub
   (c) Types of sinks used
3. Give the general principle of design of sanitary fittings.
4. What are the sanitary provisions of a house?

B. Multiple choice questions

1. Which of the following is the average fixing height for a basin?
   (a) 28–32 inches
   (b) 18–20 inches
   (c) 22–25 inches
   (d) 35–40 inches
2. A flat-type WC must be fitted at a height of __________.
   (a) 3ft
   (b) 2.5ft
   (c) 1ft
   (d) 3.75ft
3. The fixture for the toilets used to carry out human excreta is __________.
   (a) water closet
   (b) urinal
   (c) tap
   (d) faucet
4. A bell flushing cistern is made up of ______________.
   (a) cast iron
   (b) metal
   (c) wrought iron
   (d) chimney

C. Fill in the blanks

1. Washbasin is a ________________ fixture used for washing hands.
2. A console washbasin is also wall-mounted that rests on __________.
3. A water closet (WC) is a fixture for the __________ used to carry out human excreta.
4. Timed flush is used to provide __________ at regular intervals.
5. Geyser is used for __________ water in bathroom.